iPS and embryonic stem cells -- similar but not the same

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Two papers in Nature publications have raised questions about whether reprogrammed adult cells, called iPS cells, are truly interchangeable with embryonic stem cells as many have been assuming. The papers found that iPS cells created from different adult tissues still bear some hallmarks of those starting blocks.

In a press release, George Daley, who was senior author on the *Nature* paper and is Director of the Stem Cell Transplantation Program at Children's Hospital Boston, said:

> "iPS cells made from blood are easier to turn back into blood than, say, iPS cells made from skin cells or brain cells."

CIRM grantee Mahendra Rao at Life Technologies said in a story in The Scientist that iPS cells:

> "are not truly similar to [embryonic stem cells] when examined at a high resolution."

This work is generating such a stir because people have tended to think of iPS cells as the less controversial equivalent to embryonic stem cells. The same press release quotes the author of the *Nature Biotechnology* paper, Konrad Hochedlinger from the Massachusetts General Hospital Center for Regenerative Medicine, as saying that iPS cells do become more similar to embryonic stem cells the more times they divide in a lab dish.

On their blog, the Australian Stem Cell Centre wrote:

> But what does this all mean for stem cell science? Ultimately findings such as these will help to improve reprogramming technologies. It also means that scientists need to be able to continue to work with and explore all of the different types of stem cells â iPS and embryonic stem cells derived from both donated IVF embryos and SCNT embryos. Limiting research by restricting access to certain cell types at this stage would severely impact progress towards using these cells to understand and ultimately treat disease.

This work comes after several papers showing some consistent differences between embryonic and iPS cells. We've blogged about that work here and here.

Nature, July 19, 2010
Nature Biotechnology, July 19, 2010
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Tags: iPS, Stanford University